

LIV.—*A Further Revision of the Species of Scorpions belonging to the South-African Genera Uroplectes, Lepreus, and Tityolepreus* *. By R. I. POCOCK, of the British Museum of Natural History.

THE distinctions between the genera *Lepreus*, *Uroplectes*, and *Tityolepreus*, based upon the dentition of the digits of the chelæ, depends, firstly, upon the number of enlarged teeth (whether 0, 1, or 2) at the apex of the median rows; secondly, upon the position taken up by the teeth of the internal row with regard to the apices of the median series †.

Perhaps the simplest form of dentition is found in such species of *Lepreus* as *planimanus*, Karsch, *carinatus*, Poc., and *variegatus*, C. Koch, where none of the apical teeth of the median rows are enlarged and the teeth of the inner series are throughout the dental area only separated by a small space from the extremities of the median rows and form transverse series with the two enlarged teeth, constituting the posterior termination of the median rows. But the position varies a little in the species named, the inner teeth being further forward in *planimanus* and *carinatus*, so that the short transverse rows are oblique, and a little further back in *variegatus*, the transverse rows being more angular. To this section belongs, in all probability, the type of the genus *Lepreus*, *L. pilosus*, Thor., which is unfortunately unknown to me in nature.

The second type of dental formula to be noticed occurs in such species as *vittatus* and *Fischeri*, which were also referred to *Lepreus*; but the formula here is very different, the teeth of the inner set being separated by a wider space from the middle rows than in *L. planimanus*, and in the posterior five sixths of the digit the individual teeth of the inner series lie well behind the apex of the corresponding median row, so that they alternate with the pair of enlarged teeth of the outer set, instead of forming short oblique transverse rows with them. Considerable difference, however, in the position taken up by the inner teeth is observable, the teeth lying much

* Collectors and others in South Africa who are not acquainted with the generic characters of Scorpions may usually readily recognize the species belonging to this group by their small or medium size, tolerably slender build, thin claws, and bright colouring, most of the species being variegated with black and yellow spots or stripes, though sometimes the body approaches a uniform bright green or even black.

† For the sake of clearness I am considering in this instance that the teeth of the inner series have arisen independently from those forming the median series.

further back in a Transvaal example of *L. vittatus* than in the Somaliland form *L. Fischeri*. A variation of this formula is seen in *occidentalis*, where the inner teeth occupy almost the same position as in *Fischeri*, but in the distal third of the digit the apical tooth of the median series becomes a little enlarged and slightly separated from the rest, and forms with the adjacent tooth of the inner set a pair of teeth. It is upon this character in this species that Kraepelin has based his genus *Tityolepreus*.

A fourth arrangement is found in such species as *chlorodermus* and *triangulifer*, Thor., which are usually referred to the genus *Uroplectes*. In these the disposition of the teeth is only a little different from what is seen in *occidentalis (chinchozensis)*, the inner teeth at the proximal end of the digit being isolated and removed to some distance from the apices of the median rows, though in the distal two thirds of the digit they approach the median series and are paired with the slightly enlarged and separated apical teeth. The disposition, however, in the two species named is not identical, and in the closely allied species *U. olivaceus*, here described as new, yet a third variation is presented, the internal teeth being much closer to the ends of the median rows at the proximal end of the digit than in the other two.

And, lastly, there is a fifth arrangement exhibited by such species as *lineatus*, Koch, and *formosus*, Poc., in which the inner teeth are close to the apices of the median rows, forming with the two enlarged and separated terminal teeth of these rows a recurved series.

Trusting to these data, it seems to me to be logical to follow Kraepelin, refusing to recognize the three genera *Lepreus*, *Tityolepreus*, and *Uroplectes*, as established, since there are no fewer than *five* dental formulæ presented by the known species of this section, and the formula varies in closely allied species.

It seems, therefore, that if we adopt the system of splitting the species into several genera according to dentition of the digits, consistency will compel us to recognize no fewer than *five*. I prefer, however, to adopt the alternative hypothesis of referring all the species to a single genus *Uroplectes*, since, in the first place, in addition to the considerations mentioned above, we do not know the dental formula of *U. ornatus*, Pet., the type of the genus *Uroplectes*, whether it be like that of *lineatus* or like that of *triangulifer*, and consequently cannot say to which section of the species the name should be applied; nor do we know with exactness that of the species named *pilosus*, Thor., *otjimbinguensis*, Karsch, *lunulifer*, Sim., and

tricolor, Sim., for although all these forms were referred to *Lepreus*, their dentition may be of the type presented by *planimanus*, or by *vittatus*, or by *occidentalis*. And, lastly, since all these forms inhabit a single geographical area, it is in the highest degree probable that when the described forms have been re-examined and others discovered still more intermediate links than now exist will be found between the various types of dental formula. Prof. Kraepelin has, however, attempted to maintain the genera *Lepreus* and *Uroplectes* on other grounds (Jahrb. Hamb. Anstalten, xii. p. 7, 1895), referring to the former the two species *pilosus* and *planimanus*, in which there are small lateral keels on the terga, a long basal pectinal tooth in the female, and no tooth beneath the aculeus on the poison-vesicle; and to the latter the species in which there is only one crest on the terga, the basal pectinal tooth is not elongate, and there is a tooth beneath the aculeus. But as regards the armature of the vesicle, it may be said that *variegatus* of Koch, which resembles *pilosus* and *planimanus* in having the lateral tergal crests, has a large tooth on the aculeus; and concerning the structure of the basal pectinal tooth in the female, it may be added that in the female of *U. triangulifer* and of *U. Marshalli* this tooth is unmodified, and that in *variegatus* it is also of the same form as in *lineatus*, and is not elongate as in *pilosus* and *planimanus*; so that this feature cannot at present be looked upon as of generic importance. And, finally, I doubt if the genus *Lepreus* can be maintained on the presence of the lateral tergal keels; such keels, at all events, are not accorded this importance in the case of *Archisometrus tricarinatus* and *Buthus quinquestriatus*.

Uroplectes planimanus (Karsch).

Lepreus planimanus, Karsch, Mitth. Münch. ent. Ver. 1879, p. 125; Kraepelin, Jahrb. Hamb. Wissen. Anst. viii. p. 94, pl. ii. fig. 24 (1891).

The British Museum has recently received three adult examples (two males, one female) of this species from the Umfuli River, 4200 feet, in Mashunaland (*G. A. K. Marshall*). The male differs from the female in having the tail much longer (carapace 4 millim., tail 29 millim.), whereas in the female a specimen with carapace 4·3 millim. has the tail only 22 millim.

Uroplectes carinatus (Poc.).

Lepreus carinatus, Pocock, Proc. Zool. Soc., March 1890, pp. 129, 130, pl. xiv. fig. 3.

Prof. Kraepelin * has recently asserted that this species is identical with *planimanus*, Karsch; but the examination of examples of the latter species has shown me that the two, as I originally supposed, are distinct. In *carinatus* the tail is more strongly keeled, the median keel being quite strong on the third segment and distinctly traceable on the fourth, and the inferior keels on all the caudal segments and the vesicle are distinctly granular. In *planimanus* the inferior keels are smooth on at least the first and second caudal segments, weakly granular on the rest, vesicle punctured basally, the median lateral crest absent on the fourth caudal and exceedingly short on the third; and, lastly, in *planimanus*, as the name indicates, the hand, especially in the male, is flat above, broad, and with its inner edge compressed, whereas in *carinatus* it is thinner and of the normal spherical form. The small disparity in size between the type of *carinatus* and the smallest male of *planimanus* lends no support to the supposition that these distinctions are due to differences of age.

Unfortunately we have no nearer locality for this species than S. Africa, near the Tropic of Capricorn. It agrees with my examples of *planimanus* in having nine distinct median rows of teeth on the digits, without counting the exceedingly short apical set. According to Karsch there are only eight rows of these teeth.

Uroplectes variegatus (C. Koch).

Tityus variegatus, C. Koch, Die Arachniden, xi. p. 9, fig. 855 (1845).

Colour pale yellow, variegated with black; the interocular area black, mesially flavous in front, the area of the carapace behind the tubercle with a black edge, irregularly fuscous laterally and fuscous in the middle. The tergites adorned with seven black lines, the three keels on each and the lateral edges being black, with a large black patch between the edge and the lateral keel; the tail black-lined, the pigment marking the keels; there is also a black line in the middle of the dorsal surface and one in front in the middle of the inferior surface; the fifth segment fuscous throughout, only obscurely fulvo-lineate; vesicle entirely pale, aculeus posteriorly black. Chelicerae entirely pale. Chelæ with trochanter,

* Jahrb. Hamb. Wissen. Anst. xii. p. 16 (1895).

humerus, brachium, and manus variegated with black, the last two especially so posteriorly, digits pale. Legs with femora and patella variegated with fuscous; lower surface of the trunk quite pale, the last sternite only being obscurely lined with black.

Carapace coarsely granular but not carinate, the ocular tubercle granular. *Terga* coarsely granular, each of the first six marked with three granular keels, the lateral keels on the anterior segments only represented by a single tubercle, the keels on the seventh tergite strong and denticulate. Three anterior *sternites* smooth but punctured, the fourth slightly granular in the middle, more thickly at the sides, the fifth closely granular throughout, the normal keels only marked by a few larger granules.

Tail slender, a little narrowed posteriorly, about $4\frac{1}{2}$ times the length of the carapace; its intercarinal spaces finely granular; the keels well developed and granular or denticulate, the first three segments with 10 keels, with a trace of the median lateral on the fourth; the superior keels denticulate, the terminal denticle being larger; the superior borders of the fifth not carinate, the inferior strongly denticulate; the vesicle granular, with a distinct triangular tooth beneath the aculeus, the whole tail beset with strong setæ.

Palpi granular, humerus carinate, brachium not carinate, manus not carinate and not granular, hairy, rounded, about as wide as the brachium; the digits in contact, the movable about twice the length of the hand-back and furnished with 8 rows of teeth along the middle line; the basal row long; teeth of the inner series a little behind the apices of the corresponding median rows.

Legs granular; the feet not thickly hairy beneath.

Pectines short, furnished with 15 teeth, of which the basal is enormously enlarged but not elongate.

Total length 28 millim., of tail 16·5, of carapace 2·8.

Loc. Cape Town (*H. A. Spencer and G. H. R. Fisk*) and Simon's Town (*De la Garde*).

A single female example taken by each of the above collectors.

This species resembles *pilosus*, Thorell, *planimanus*, Karsch, *lunulifer*, Simon, and *carinatus*, Pocock, in possessing three keels upon the tergites; in these other species, however, the pectinal teeth are over 20 in number, varying from 23 to 31, and there is no tooth beneath the vesicle on the tail.

I have published a full description of this species, because, so far as I am aware, no examples of it have been examined or described since 1845, when C. Koch first established it; and

it was under the guidance of this description that Prof. Kraepelin was led to locate the species in close proximity with *U. lineatus*. Its true position amongst the South-African species may be seen by referring to the synoptical table.

Uroplectes lineatus (C. Koch).

Tityus lineatus, C. Koch, Die Arachniden, xi. p. 7, fig. 854 (1845);
Kraepelin, Jahrb. Hamb. Wissen. Anst. viii. p. 89 (1891).

During recent years the British Museum has received a large number of specimens of this species from Cape Town and from Wynberg, Hoet's Bay, and Kalk Bay in the neighbourhood (*H. A. Spencer*), also one from Simon's Town (*De la Garde*), making a total of 17 specimens of different sizes and sexes. The males differ from the females in having the tail longer, the hand thicker, and the basal pectinal tooth not enlarged.

The colour is very fairly constant, that of the upperside of the trunk consisting, roughly speaking, of three yellow bands alternating with four black ones; but the yellow bands are not continuous, the median one being broken up by a pigment patch on the keel and the lateral ones being in reality extensions of the > <-shaped markings so characteristic of many species of this genus. The tail is banded with black, the bands mostly marking the keels, but at the sides, especially of the posterior segments, they show a tendency to broaden and fuse; the lower side of the first three segments is pale, with a fine median black line; the vesicle is always yellow.

Uroplectes insignis, Poc.

Uroplectes insignis, Poc. Proc. Zool. Soc. 1890, p. 131, pl. xiii. fig. 4.

This species was based upon a couple of examples obtained by Dr. Dobson on Table Mountain, and at the time, owing to scarcity of material of this form and of *U. lineatus*, I was unable to compare the two in any detail. But, thanks to the acquisition of a large number of examples from Table Mountain (*H. A. Spencer*), I am now able to point out that it resembles *U. lineatus* in almost all structural characters, although differing considerably and, apparently, constantly in being far more strongly pigmented. For instance, the banding of the trunk observable in *lineatus* does not appear here, the two lateral yellow bands of the former being reduced to the > <-shaped markings; the vesicle, moreover, is black below and at the sides, with four fine yellow lines, and the median black stripe on the lower surface of the tail is broad and

divided by a fine yellow line. The only other distinctive feature that I notice in this form is the smaller size of the tubercle beneath the aculeus.

From the constancy of these characters it seems to me that *U. lineatus* must at all events be looked upon as a distinct subspecies, a melanistic mountain form, of *U. lineatus*. It is a significant and interesting fact that Mr. H. A. Spencer, who, while acting as medical officer on board the U.S.S. 'Mexican,' was collecting on and off for some years in S. Africa, never took the typical *U. lineatus* upon Table Mountain nor *U. insignis* on the lower ground in the neighbourhood of Cape Town, and he himself was struck by the darker tint of the mountain form.

Uroplectes formosus, Pocock.

Uroplectes formosus, Pocock, Proc. Zool. Soc. 1890, p. 134, pl. xiii. fig. 3.

Principal form.—With a single small fuscous spot upon the upper surface of the trochanter of the palp; two spots upon the femur, one at its distal and the other at its proximal end; two spots upon the tibia, one small, distal, the other larger but irregularly defined and median; the hand blacker; a fuscous spot upon the maxillary lobes of the first and second pairs of legs. The >-shaped spot very indistinctly defined; the last tergite almost entirely black at the sides, with only a very narrow yellow stripe just above the black margin; the lower surface of this last segment also almost entirely fuscous, with a posterior median triangular yellow spot. The upper surface of the first four tail-segments entirely orange-red, not black; the lower surface of these segments with a thin inferior median black band and adorned with irregular black patches at the side. The vesicle of the tail with scarcely a trace of yellow lines.

Loc. Port Natal (*E. Howlett*).

Uroplectes formosus, Poc., subsp. *Spenceri*, nov.

Coxæ and maxillary lobes of the anterior appendages without fuscous spots; a single large fuscous patch covering the proximal end of the humerus above; the proximal patch upon the brachium larger and better defined; the hand paler and distinctly black-lined. The flavous >-shaped mark on the tergites well defined, the seventh tergite largely flavous at the sides; the sternite flavous, with three black bands, one slender median and one on each side wider and less well defined. The anterior four segments furnished with seven

well-defined black longitudinal lines, one inferior and median and three on each side, the upper marking the superior keels; the vesicle distinctly yellow-lined.

Loc. East London (*H. A. Spencer*).

In addition to the large number of examples obtained at the above locality Mr. Spencer brought back others from Port Elizabeth which, while agreeing in the main with the typical East London examples, differ from them in being rather more deeply pigmented. For example, the ><-shaped marks on the terga are less distinct, almost the entire upper surface of the brachium and humerus is fuscous, and the black lines on the tail are wider, so that sometimes they anastomose.

Uroplectes triangulifer, Thor.

Uroplectes triangulifer, Thor., Actes Soc. Ital. Sci. Nat. xix. pp. 123-126 (1876).

On pl. xiii. fig. 5 of my paper (Proc. Zool. Soc. 1890) upon South-African Buthidæ I give a figure of the male of this species taken from an example collected at Pietersberg (Transvaal) by Mr. C. R. Jones, this being the only example contained at that time in the Museum collection; but since then we have received fresh examples from Port Elizabeth (*H. A. Spencer*) and Basutoland (*R. C. Wroughton*).

The differential characters of this form and its allies are pointed out in the synopsis of the species.

Uroplectes chlorodermus, sp. n.

Uroplectes flavoviridis, Peters, Pocock, P. Z. S. 1890, p. 135, pl. xiv. fig. 5; not *U. flavoviridis*, Peters, Mon. Ak. Wiss. Berlin, 1862, p. 516.

This species, of which I have given a full description of both sexes in the Proc. Zool. Soc. for 1890, I formerly regarded as identical with *U. flavoviridis* of Peters, from Tette; but I am now of opinion that the two must be regarded as distinct, on the grounds that Peters describes the underside of the tail of his species as shining and finely granular, whereas in my specimens its first three segments are quite smooth and studded with coarse punctures, which can scarcely have been overlooked by Peters and, still less, described by him as fine granules. Moreover, this author states that the basal pectinal tooth is of striking size and falciform ("sichelförmig") in shape, from which I infer that he had before him a scorpion with the sickle-shaped basal pectinal tooth of *U. planimanus* or *U. lunulifer*, and not an example with this tooth merely expanded, as is the case in *U. chlorodermus*.

In addition to the examples of this species from E. Africa and Lake Nyassa that I have previously recorded, the Museum has received it from Fort Salisbury, Mashunaland, 5000 feet (*G. A. K. Marshall* *). *U. chlorodermus* resembles *triangulifer* in many characters—for instance, in the thin spine-armed hand of the male, approximately in the arrangement of the teeth on the digits of the chelæ; it may, however, be recognized by being of a uniformly deep green colour, and having the anterior caudal segments smooth, punctured, and not carinate below, the basal pectinal tooth expanded in the female, and the sides of the upper surface of the fifth caudal segment straight and abruptly sloped posteriorly. In the three last-named respects it approaches the Somaliland and East-African *U. Fischeri*, Karsch.

Uroplectes olivaceus, sp. n.

Colour somewhat the same as in *U. flavoviridis*, Peters, but the green paler, more emerald on the upper surface of the trunk and chelæ, yellower on the tail; fingers and trochanter of chelæ yellow; legs yellow and green, a broad band of the latter colour occupying the whole of the middle of the femur and patella; lower surface of trunk yellow or greenish yellow.

Carapace as long as the second caudal segment, finely and closely granular throughout; ocular tubercle smooth. *Terga* also finely granular, more coarsely so posteriorly, the median keel smooth, but the keels on the last granular.

Sterna smooth and polished, the last very weakly granular at the sides.

Tail about $6\frac{1}{2}$ times the length of the carapace, robust, parallel-sided; the inferior median keels weak, obsolete on segments 4 and 5; a weak median lateral keel on segments 1 to 3; all the keels and the intercarinal spaces granular except the median area on the lower surface of the first segment and the upper surface of all the segments, which are at most feebly granular; the upper keels of segments 1 to 3 ending in an enlarged denticle; upper edges of the fifth segment high and strongly convex; the hinder half of the upper surface very deeply impressed for the reception of the

* Mr. Marshall has recently sent me the following species of Scorpions from Mashunaland:—*Opisthophthalmus carinatus*, Pet., Umfuli River; *O. glabrifrons*, Pet., Salisbury and Umfuli River; *Hadogenes troglodytes*, Pet., Umfuli River; *Uroplectes chlorodesmus*, Poc., Salisbury; *U. planimanus* (Karsch), Umfuli River. It is interesting to note that, with the exception of the last-named, the species are identical with those that Peters has recorded from Tette on the Zambesi.

vesicle; vesicle coarsely granular below, a small denticle some distance below the root of the aculeus, its upper surface depressed at the base, strongly convex on its distal half, the curvature of which is continuous with that of the vesicle.

Chela long and slender; humerus and brachium finely and closely granular above, more coarsely granular in front; manus slender, about as wide as the brachium, smooth, but punctured and hairy; a distinct tubercle on its inner surface at the base of the digits; width of hand a little more than half the length of the hand-back; hand-back less than half the length of the movable digit; digits long, rather strongly curved at the end; 11 rows of teeth along the median series, the basal row long, with an enlarged denticle on each side of it near the middle of its length; the teeth of the inner series lying close up to and a little behind the apical tooth of the median rows, which is scarcely larger than the rest and not separated from them by a larger space than that which separates the rest of the teeth of the median rows from each other.

Legs weakly granular externally.

Pectines long, with 23-24 teeth.

Measurements in millimetres.—Total length 60; length of tail 38, of carapace 5.7; width of hand 1.5; length of hand-back 3, of movable digit 6.5.

Loc. Murchison Range, Transvaal (*C. R. Jones*).

Belonging to the same category as *U. chlorodermus* and *U. triangulifer*, but recognizable from both in the characters pointed out in the synopsis.

Uroplectes vittatus (Thor.).

Lepreus vittatus, Thorell, Act. Soc. Ital. Sci. Nat. xix. p. 121.

A single female example of this species recently received from the Murchison Range, Transvaal (*C. R. Jones*), presents the following type of coloration:—

Carapace ornamented in front with a triangular black patch lying between the eyes; the posterior apex of this patch extends beyond the ocular tubercle halfway towards the posterior margin, the posterior edge with two transverse black lines and the lateral edge black nearly up to the lateral eyes. The anterior four *terga* with black or partly black edges, all of them except the last, which is almost of a uniform yellow, furnished with two large conspicuous black spots, which constitute together a double dorsal band, but each of these black spots is distinctly divided by a >-shaped yellow mark; the yellow bands which lie between the black bands are subequal

in width and much more brightly coloured posteriorly. Tail yellow, passing into a redder tint posteriorly; the lower surface of the first segment is furnished behind with two abbreviated black lines, that of the third has the corresponding lines better developed and a slender median line which takes its origin from a conspicuous black spot on the anterior portion of the segment; ornamentation of the same kind is noticeable upon the lower surface of the two following segments, but it is less clearly defined on the fourth.

Legs and palpi yellow; digits infuscate.

Thorell's type from Caffraria was doubtless a male, since no reference is made to the enlargement of the basal pectinal tooth observable in my example, in which there are 18-19 teeth, the basal being modified as in *U. occidentalis* and *lineatus*, and not elongate as in *U. planimanus* and *lunulifer*. This specimen also differs in two other respects from Thorell's description, since it possesses twelve rows of teeth along the middle line of the digits, instead of eleven as stated by Thorell, and the movable digit is nearly twice the length of the hand-back ($5\frac{3}{4} : 3$), whereas in the type of *vittatus* the difference is much less, being only $5\frac{1}{2} : 4$. But without more specimens for examination it is not possible to say whether a specific or subspecific value is to be attached to these features.

Uroplectes Fischeri, Karsch.

Uroplectes Fischeri, Karsch, Mitth. Münch. ent. Ver. 1879, p. 124.

Recorded from Barawa in Somaliland; the British Museum has recently received examples of apparently the same species from Mombasa (*D. J. Wilson*) and East Africa (*Imperial British East Africa Company*). According to Kraepelin this species is identical with the foregoing *U. vittatus*, but the three above-mentioned examples referred to *Fischeri* may be distinguished from the Transvaal example of *vittatus* in the features pointed out in the diagnosis. Kraepelin's description is apparently based upon specimens from unstated localities, one only being mentioned as coming from Somaliland, and this is probably identical with *Fischeri*. According to this author the variation in colour presented by the "species" is very great, specimens even having the segments of the legs ringed with black. The examples seen by me agree with Karsch's description, except that they seem to approach my example of *U. vittatus* more nearly in colour and have the hands pale, whereas in the type of *Fischeri* these organs are said to be marked with longitudinal blackish lines. The specimen that I described as *nigrimanus* seems to represent a melanistic

form of the same species and may provisionally, at all events, rank as a subspecies.

Uroplectes occidentalis, Simon.

Uroplectes occidentalis, Simon, Bull. Soc. Zool. France, 1876, p. 219.
Tityus chinchoxensis, Karsch, Zeits. Naturw. lii. p. 370 (1879).

The British Museum has examples of this species from the Congo (whence the type was obtained), Angola, and Cete Cama (Gaboon); but, according to Kraepelin, it spreads as far to the north as Sierra Leone and eastwards and southwards into Somaliland, Masailand, and Natal. If these localities are trustworthy, the species has a wider range in Africa than any indigenous scorpion with which I am acquainted. Furthermore, this author also affirms that he has examined specimens from Sumatra, Java, Borneo, and Celebes.

As stated above, this species, of which I have published a coloured figure in the Proc. Zool. Soc. 1890, pl. xiv. fig. 4, is the type of Kraepelin's genus *Tityolepreus*; but I feel satisfied of the impossibility of separating it generically from such forms as *vittatus* and *Fischeri*.

Synopsis of the South-African Species contained in the Collection of the British Museum.

1. Abdominal terga with a lateral abbreviated keel on each side as well as the median; teeth of the inner set close to and not behind the apices of the adjacent median rows; crests on the lower surface of the tail well developed.
 - a. Vesicle of tail without a distinct tooth beneath the aculeus; a large number of pectinal teeth (up to 30): female with the basal pectinal tooth long and falciform (? in *carinatus*).
 - a¹. The crests of the tail weakly granular, the inferior ones on at least the first and second segments smooth; median lateral keel weak on the third segment, absent on the fourth; hand, especially in the male, broad, flat, with compressed inner edge *planimanus* [(Karsch).
 - b¹. The crests on the tail, including the lower ones on the first and second segments, strongly granular; the median lateral crest strong on the third segment and distinct on the fourth; hand in the male normally rounded. *carinatus* (Poc.).
 - b. A distinct triangular tooth beneath the aculeus; pectines with 15 teeth in ♀, basal tooth expanded but not elongate; tail crested and granular as in *carinatus* *variegatus* (Koch).
2. Abdominal terga without lateral crests; tail coarsely punctured below, almost entirely

smooth, and without crests, the superior keels represented by a terminal granule, and sometimes on the first and second segments by a few smaller granules; inner set of teeth on digits isolated and, except at the distal end, lying far from the apices of the adjacent median rows; hand of male not internally spined; basal pectinal tooth in female expanded but not elongate; (prevailing colour mostly yellow, with a black patch on each side of the terga 1 to 6; tail posteriorly infusate and basal half of digits also darker).

- a². Apical teeth of the median rows at the distal end of the digits enlarged and slightly separated from the rest, and pairing with the adjacent teeth of the inner set; (hand internally granular; vesicle smooth below; a small tooth beneath the aculeus; fifth caudal segment almost as in *Fischeri*) *occidentalis* (Sim.).
- b². Apical teeth of the median rows scarcely enlarged and hardly separated from the rest, so as to pair with the adjacent teeth of the inner set.
- a³. Vesicle rugose below, with only a small tuberculiform tooth beneath the aculeus; upper edges of the fifth caudal segment evenly convex from end to end; hand internally granular; internal teeth of digits further back, the ninth from the base on a level with the apex of the adjacent median row *vittatus* (Thor.).
- b³. Vesicle smooth, coarsely punctured below, with a distinct triangular tooth; superior edges of the fifth caudal segment elevated behind and terminating in a nearly vertical margin; internal teeth of the digits further forward, the sixth or seventh from the base on a level with the apex of the adjacent median row *Fischeri* (Karsch).
- 3. Terga with a single crest as in section 2, the superior and superior lateral crests of the tail well developed and granular; at least the lower surface of the vesicle and of the fifth segment granular below; hand in the ♂ slender and armed internally with a denticle, which is visible as a tubercle in the ♀; more of the basal teeth of the internal series isolated, but, at least in the distal two thirds of the digit, they are paired with the enlarged and separated apical tooth of the adjacent median rows.
- a⁴. Anterior four caudal segments smooth below, not carinate, but punctured as in section 2; sides of the fifth segment of the tail as described under b³; a distinct tooth beneath the aculeus of the tail; basal pectinal tooth enlarged as in section 2; colour uniform deep green, with paler flavous markings *chlorodermus*, sp. n.

- b⁴. All the normal caudal keels at least visible, the lower surface of at least the second, third, and fourth segments granular, not punctured; uppersides of the fifth caudal segment convex from end to end, not posteriorly elevated; basal pectinal tooth in the ♀ (? *olivaceus*) not enlarged.
 - a⁵. The inferior caudal crests weak, nearly obsolete, and lost amongst the granules of the lower surface; those on the first segment smooth; the superior and superior lateral keels of segments 1, 2, and 3 with terminal denticle much enlarged; vesicle in the ♂ but little modified; colour greenish, approaching what is seen in *chlorodermus* . . . *olivaceus*, sp. n.
 - b⁵. All the crests of the tail strong and well defined, those on the lower surface of the first segment granular; vesicle strongly compressed in its basal half, with an angular prominence beneath the aculeus; prevailing colour yellow, with two black patches on the terga, each marked with a >. (*triangulifer*, Thor.)
- 4. Terga as in 2 and 3; tail almost as in a⁴, with smooth unkeeled lower surface; the fourth and fifth segments and vesicle granular, superior keels distinct, with enlarged terminal tooth; hand in the male enlarged, without an inner tubercle in either sex; in the distal two thirds of the digit *two* of the teeth of the median rows are enlarged and separated to form a trio with the adjacent teeth of the inner set. . . .
- a⁶. The lower surface of the vesicle and of the fifth caudal segment more coarsely and sparsely granular; superior keels stronger; middle keel of the terga wholly or partly black.
- a⁷. Vesicle clear yellow; terga marked with alternating black and yellow bands. (Typical form.) *lineatus* (Koch).
- b⁷. Vesicle fuscous, with fine yellow lines; terga darker, not distinctly banded, ornamented with well-defined ><-shaped stripes. (Melanistic subspecies.) *insignis*, Poc.
- b⁸. The lower surface of the vesicle and of the fifth caudal segments finely and closely granular; superior keels weaker; a continuous median flavous band on the terga.
- a⁸. Chelæ, with the exception of the black bands and a few small fuscous spots, orange-yellow; a conspicuous spot on the base of the maxilla above; the apices of the maxillary processes of the first and second pairs of legs fuscous; last abdominal sternite almost wholly black, a flavous spot in the middle; terga almost entirely smooth and polished. (Typical form from Natal.) . . . *formosus*, Poc.
- b⁹. Hands of chelæ paler, with deep black bands; brachium and humerus with large fuscous

patches; without fuscous tips to the maxillary lobes of the first and second pairs of legs and scarcely a trace of a black patch on the maxillary (basal) segment of the chela; last abdominal sternite flavous, with a black patch on each side of it: terga more distinctly granular. (Subspecific form from East London.) *Spenceri*, nov.

The sections indicated in this table by the numbers 1, 2, 3, 4 represent, I believe, the natural groups into which the species fall; but at present, for reasons stated above, I do not consider it advisable to adopt generic titles for these sections. Probably, however, the name *Lepreus* applies to no. 1 and *Tityolepreus* to no. 2; but it appears to me by no means certain whether *Uroplectes*, the oldest name for the group, is applicable to 2, 3, or 4.

The following species, unknown to me in nature, also fall into this genus:—

1. *Scorpio (Atreus) spinicaudus*, Gervais (Arch. Mus. iv. p. 222, pl. xi. figs. 22–25, 1844), from Caffraria, will probably be found to belong to no. 4, and will perhaps prove identical with *U. formosus Spenceri*.

2. *Tityus fallax*, C. Koch ('Die Arachniden,' xi. p. 1, fig. 850), from Africa, also apparently falls under no. 4. If adult, the type probably represents a species distinct from those enumerated, but if immature may prove to be the young of *U. insignis*.

3. *Tityus striatus*, C. Koch (*t. c.* p. 6, fig. 853), from Africa.—The same remarks apply to this form as to *T. fallax*. On the strength of the figures of these species it is impossible to say for certain that they are synonymous with any of those recognized in the above table; for it is unjustifiable to ascribe inaccuracy to these figures, seeing how accurate on the whole are those of *U. lineatus* and *U. variegatus*.

4. *Uroplectes ornatus*, Peters (Mon. Ak. Wiss. Berlin, 1862, p. 516), from Tette, was said by Karsch to fall into "*Tityus*" of C. Koch, a statement which means presumably that it belongs to the same category of species as *U. triangulifer*, Thor. It is a pity that we cannot locate this species more satisfactorily, for since it is the type of the genus *Uroplectes*, its exact systematic position is of the greatest importance to those who would more finely divide the genus.

5. *Uroplectes flavoviridis*, Peters (Mon. Ak. Wiss. Berlin, 1861, p. 516), from Tette.—The position of this species is also one of perplexity. The only other species, so far as I know, that have been accredited with a falciform basal pectinal tooth are *U. planimanus* and *U. lunulifer*; but these certainly differ from *flavoviridis* in having the lower side of the tail distinctly carinate.

6. *Lepreus pilosus*, Thorell (Act. Soc. Ital. xix. p. 118, 1876), from Caffraria, the type of the genus *Lepreus*, without much doubt falls in section 1 of the table, but certainly differs from the forms enumerated there in having the median inferior keels obsolete on the first, second, third, and fourth segments of the tail.

7. *Lepreus otjimbinguensis*, Karsch (Mittl. Münch. ent. Ver. 1879, p. 125), from Otjimbingue, near Walfisch Bay.—Judging from the description I should say that this species belongs to section 2 of the table; but it certainly differs from the species there mentioned in having the median part of the terga black and not yellow.

8. *Lepreus lunulifer*, Simon (Ann. Soc. Ent. Fr. 1887, p. 375), from Namaqua or Damaraland, is evidently very nearly allied to *L. planimanus*, Karsch. Kraepelin, indeed, holds the two to be identical. At all events, it is not possible without a comparison of the types to express the differential characters from the description alone.

9. *Tityus tricolor*, Simon (Bull. Soc. Ent. Belg. xxvi. p. lix, 1882), from the area lying between Zanzibar and the lake region, almost certainly falls into section 2. From the fact that Simon refers it to *Tityus* I am inclined to think the dentition of the digits will be found to resemble that of *occidentalis*, Sim., to which, as well as to *vittatus* and *Fischeri*, the species is evidently nearly allied.

SUPPLEMENT.

Whilst this paper has been in the printer's hands I have received from Mr. G. A. K. Marshall a couple of species of this genus from Durban. One of these proves to be *U. planimanus* of Karsch, identical in almost all respects with the Mashunaland example mentioned above; but the other appears to be an undescribed form, which I propose to dedicate to its discoverer and diagnose briefly in the following terms:—

Uroplectes Marshalli, sp. n.

Closely related to *U. triangulifer*, Thor., in all essential

points of structure, and falling under section *b*⁵ of the above table, but easily recognizable from this species in the following features :—

Colour of trunk and tail a deep and uniform black, the appendages deep green; the three basal segments of the chelæ paler green than the brachium and manus; fingers yellowish green; femora and patellæ of the legs also deeper than the rest, the adjacent ends of these segments, as well as the opposite end of the patella, conspicuously red; the maxillary lobes of the first and second legs deeper green than the rest of the coxæ.

Granulation of the trunk and tail and keels on the latter developed as in *triangulifer*; area of the vesicle below the aculeus prominent, but only furnished with a tubercle, which is considerably smaller than that of *triangulifer*.

Pectinal teeth 18–18, 20–21 in ♀, 18–20 in ♂; the teeth longer in the latter, but the basal tooth not enlarged in the former.

Vesicle of male modified as in *U. triangulifer*, and, as in that species and in *chlorodermus*, the spike on the hand is larger in this sex than in the female.

Measurements in millimetres.—♀, total length 40, carapace 4, tail 22·5; ♂, total length 35, carapace 3·5, tail 22.

Loc. Durban.

A male and two females with many young were taken. It is interesting to note that the young specimens, 8 millim. in length, present the colouring of the adults with the exception of being a little paler.

Note.—In two papers upon African Scorpions recently published (in the March and April issues of the 'Annals') I have recorded certain species from the Umfuli River, Mashunaland; but, owing to the partial obliteration of the label, the altitude was given as 1200 feet. It is, in reality, as Mr. Marshall informs me, 4200 feet, the exact spot being known as Gadzima.

LV.—*Descriptions of new Reptiles and Batrachians collected in Celebes by Drs. P. and F. Sarasin.* By G. A. BOULENGER, F.R.S.

Tropidonotus Sarasinorum.

Maxillary teeth 25, the posterior very feebly enlarged. Snout rather prominent, obtusely truncate; eye moderate. Rostral much broader than deep, not visible from above;